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# मानक

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IS 3499-2 (1985): metal chairs for office purposes  
Specification, Part 2: Revolving and tilting [CED 35:  
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IS : 3499 ( Part 2 ) - 1985

*Indian Standard*  
SPECIFICATION FOR  
METAL CHAIRS FOR OFFICE PURPOSES  
PART 2 REVOLVING AND TILTING  
(*Second Revision*)

UDC 684-434\*044: 651-2



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INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

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*Indian Standard*  
SPECIFICATION FOR  
METAL CHAIRS FOR OFFICE PURPOSES  
**PART 2 REVOLVING AND TILTING**  
( *Second Revision* )

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*Indian Standard*  
SPECIFICATION FOR  
METAL CHAIRS FOR OFFICE PURPOSES  
**PART 2 REVOLVING AND TILTING**  
( *Second Revision* )

**0. FOREWORD**

**0.1** This Indian Standard ( Part 2 ) ( Second Revision ) was adopted by the Indian Standards Institution on 25 January 1985, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** This standard was first published in 1966 and subsequently revised in 1976. The present revision incorporates the changes considered necessary to bring the standard up to date. Besides incorporating an amendment<sup>†</sup> the grades of the various materials have been specified and provision for padded arm rests has also been made.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

**1. SCOPE**

**1.1** This standard ( Part 2 ) covers the requirements of materials, dimensions, construction and finish of revolving and tilting metal chairs for office purposes.

**2. MATERIALS**

**2.1 Aluminium Tubes** — Aluminium tubes shall conform to IS ^Designation 62400, 63400 or 65032 of IS : 1285-1975t.

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\*Rules for rounding off numerical values ( *revised* ).

†specification for wrought aluminium and aluminium alloy, extruded round tube and hollow sections ( for general engineering purposes ) ( *second revision* ).

## IS : 3499 ( Part 2 ) - 1985

**2.2 Electrodes** — Electrodes for gas; arc and spot welding shall conform to IS : 1278-1972\*, IS : 814 ( Part 1 )-1974† and IS : 4972-1968‡ respectively.

**2.3 French Polish** — French polish shall conform to IS : 348-1968§.

**2.4 Wax Polish** — Wax polish shall conform to IS : 8542-1977||.

**2.5 Mild Steel Sheets** — Mild steel sheets shall conform to grade 0 of IS : 513-19731 or grade 0 of IS : 1079-1973\*\*.

**2.6 Steel Tubes** — Steel tubes shall conform to IS : 7138-1973††.

**2.7 Screws** — Screws shall conform to IS : 1365-1978‡‡.

**2.8 Wood** — The wood suitable for furniture as specified in IS : 399-1963§§ shall be used.

## 3. DIMENSIONS

**3.1** The dimensions of the chair shall be as given in **3.1.1** to **3.1.4**.

**3.1.1 Height of Seat** — The height of the seat of chair from the floor surface shall be adjustable within the range of 400 to 500 mm.

**3.1.2 Width of Seat** — Minimum width of the seat shall be 450 mm measured at a point midway along the effective depth of seat.

**3.1.3 Effective Depth of Seat** — Minimum effective depth of seat shall be 400 mm. This shall be measured from a vertical line through the centre of the front edge of the seat to a vertical line through the centre of the back of the seat.

**3.1.4** Minimum overall dimensions of chairs shall be as follows:

Overall height	785 mm
Overall width including arm rests	535 mm

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\* Specification for filler rods and wires for gas welding { *second revision* }.

† Specification for covered electrodes for metal arc welding of structural steel: Part 1 For welding products other than sheets (*fourth revision*).

‡ Specification for resistance spot-welding electrodes.

§ Specification for French polish (*First revision*).

|| Specification for polish for wooden furniture, paste.

¶ Specification for cold rolled carbon steel sheets ( *second revision* ).

\*\* Specification for hot rolled carbon steel sheet and strip (*third revision* ).

†† Specification for steel tubes for furniture purposes.

‡‡ Specification for slotted countersunk head screws ( *third revision* ).

§§ Classification of commercial timbers and their zonal distribution ( *revised* ).



#### 4. FABRICATION

**4.0 Components** — Metal chairs shall be assembled from the components as given in 4.1 to 4.8.

**4.1 Base** — The base shall have minimum, four legs made from steel tubular pipes of wall thickness not less than 1.60 mm or from aluminium tubes with a wall thickness not less than 2.0 mm or from mild steel sheets not less than 1.0mm thick. The tubular pipe shall be either round or square in section. The outside diameter of the round tubular pipe shall be not less than 25 mm and in the case of square section the side of the square shall be not less than 20 mm.

**4.2 Frame** — The frame for chair shall be made from steel tubular pipes of wall thickness not less than 1.20 mm or from aluminium tubes with a wall thickness not less than 2.0 mm. The tubes shall be either round or square in cross-section. The outside diameter of the round tubular pipes shall be not less than 25 mm and in the case of square section the side of the square shall be not less than 20 mm.

**4.3 Revolving and Tilting Screw** — The chair shall have a fitting with a vertical axle for swivelling and a horizontal axle for tilting. The lateral movement is controlled by an adjustable spring or springs and their compression can be varied by a knob. This fitting shall be capable of supporting a load of 150 kg placed in the seat without any wobbling when the seat is rotated or tilted.

**4.4 Seat** — The seat shall be padded or caned ( *see* IS : 5378-1969\* ).

**4.5 Back-Rest** — The back-rest shall not be less than 250 mm in height. It shall be caned or padded.

**4.6 Castor Unit** — Castor unit shall be mounted on legs. Castor units shall have wheels or balls between the forks of the castor so as to allow easy rotation under load. The wheel or ball shall be hard and wear-resistant and shall not be less than 20 mm and not more than 50 mm in diameter.

**4.7 Ends of Tubes** — The open ends of tubes shall be provided with caps made from metal, plastic or rubber.

**4.8 Arm-Rests**—Arm-rests shall be made from wood suitable for furniture conforming to IS : 399-19631. The arm-rest may also be padded. These shall be so shaped as to ensure comfort to the users, and shall be fixed securely with screws from the under-side of the tubular arms.

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\* Specification for polyethylene cane.

†Classification of commercial timbers and their zonal distribution ( *revised* ).

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### 5. ASSEMBLY

**5.1** The components shall be Assembled by means of welding, bolting or screwing.

**5.2** The method of gas, arc and spot welding shall conform to IS : 1323-1966\*, IS : 816-1969† and IS : 819-1957‡ respectively.

**5.3** Welding of aluminium parts shall be in accordance with IS : 2812-1964§.

### 6. FINISH

#### 6.1 Metal Components

**6.1.1** All dents, burrs and sharp edges 'shall be removed from the various components. The components shall be individually pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign element.

**6.1.2** Immediately after pickling, all the mild steel parts shall be given phosphating treatment conforming to Class C of IS : S618-1966||. The process for application of phosphate coating shall be in accordance with IS : 6005-197bf.

NOTE — Putty shall be applied to all the surfaces requiring 'filling and shall conform to IS : 110-1968\*\*. Aluminium primer shall conform to IS : 5660-1970ff.

**6.1.3** Coat/coats of enamel paint shall then be applied as follows:

- a) Finish coat with enamels conforming to IS : 151-1950‡‡  
IS : 2932-1974§§ or IS : 2933-1975||||.

•Code of practice for oxy-acetylene Welding for structural work in mild steel { *revised* ).

†Code of practice for metal arc welding for general construction in mild steel { *first revision* ).

‡Code of practice for resistance spot welding for light assemblies in mild steel.

§Recommendations for manual tungsten inert gas arc-welding of aluminium and aluminium alloys.

||Specification for phosphate treatment of iron and steel for protection against corrosion. .

¶Code of practice for phosphating of iron steel.

\*\* Specification for ready mixed paint, brushing, grey filler, for enamels, for use over primers { *first revision* ).

††Specification for ready mixed paint, brushing, aluminium red oxide primer.

‡‡Specification for ready mixed paint, spraying, finishing, stoving, enamel, for general purposes, colour as required.

§§Specification for enamel, synthetic, exterior (a) under coating, (b) finishing { *first revision* ).

||||Specification for enamel exterior (a) undercoating, (b) finishing { *first revision* ).

- b) In case of stoving enamel the components shall thereafter be baked at a specified temperature in an oven heated uniformly. The finish shall be smooth and uniform with hard tough film of enamel strongly adhering to the surface. The finish shall be free from all visible defects and shall not chip when tapped lightly with a dull pointed instrument.

**6.2** Aluminium parts may be anodized, if required by the purchaser.

**6.3** Wooden Arms — The wooden arms shall be polished either with wax polish or a transparent glossy French polish, or stained dark and polished or lacquered as desired by the purchaser.

## **7. PERFORMANCE REQUIREMENTS OF FINISH**

**7.1 Scratch Hardness Test** — A sample of mild steel plate 150 X 50 mm in size and thickness 0.315 mm and finished as described in 6 shall be subjected to scratch hardness test in accordance with **15.1** of IS : 101-1964\*. A scratch, showing the bare metal, shall not be produced in the test sample.

**7.2 Pressure Test** — Samples prepared from mild steel plates of thickness 0.315 mm and finished as described in 6 shall be subjected to pressure test in accordance with **15.2** of IS : 101-1964\*. The metal surface shall not be rendered visible when the test pieces are separated after the test.

**7.3 Flexibility and Adhesion Test** — A sample of mild steel plate 150 X 50 mm in size and thickness 0.315 mm and finished as described in 6 shall be subjected to flexibility and adhesion test in accordance with 16 of IS : 101-1964\*. The paint film on the test piece shall not show damage, detachment or cracking when examined under X 10 magnification.

**7.4 Stripping Test** — A sample of mild steel plate 150 X. 50 mm in size and thickness 0.315 mm and finished as described in 6 shall be subjected to stripping test in accordance with 17 of IS : 101-1964\*. The scratch produced after the test shall be free from jagged edges.

**7.5 Test for Protection Against Corrosion Under Conditions of Condensation** — A mild steel panel of size 150 X 100 mm and thickness 1.25 mm and finished as described in 6 shall be subjected to test for protection against corrosion under conditions of condensation in accordance with **18** of IS : 101-1964\*. The metal surface shall show no signs of corrosion after the test.

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\* Methods of test for ready mixed paints and enamels ( *second revision* ).

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**8. PACKING**

**8.1** All the component parts shall be packed in such a way that no damage is caused to them during transit.

**9. INFORMATION TO BE SUPPLIED BY THE PURCHASER**

**9.1** The purchaser shall supply the following information to the supplier along with the order;

- a) Type of seat required;
- b) Type of back required;
- c) Whether castor unit required and what type;
- d) Colour of finish; and
- e) Where alternative methods of construction and finish are specified, these shall be clearly stated in the order.

**10. MARKING**

**9.1** All metal chairs shall be marked with a suitable mark identifying the manufacturer.

**9.2** The metal chairs may also be marked with the ISI Certification Mark.

NOT is — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.



## INDIAN STANDARDS INSTITUTION

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha  
( Common to all Offices )

### Regional Offices :

#### Telephone

\*Western : Manakalaya, E9 MIDC, Marol, Andheri ( East ), 6 32 92 95  
BOMBAY 400093

†Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, 36 24 99  
Maniktola, CALCUTTA 700054

Southern : C. I. T. Campus, MADRAS 600113 41 24 42

Northern : B69 Phase VII, Industrial Focal Point, 8 73 28  
S. A. S. NAGAR 160051 ( Punjab )

### Branch Offices :

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, { 2 63 48  
AHMADABAD 380001 { 2 63 49

'F' Block, Unity Bldg, Narasimharaja Square, 22 48 05  
BANGALORE 560002

Gangotri Complex, Bhadbhada Road, T. T. Nagar, 6 27 16  
BHOPAL 462003

22E Kalpana Area, BHUBANESHWAR 751014 5 36 27

5-8-56C L. N. Gupta Marg, HYDERABAD 500001 22 10 83

R14 Yudhister Marg, C Scheme, JAIPUR 302005 6 98 32

117/418 B Sarvodaya Nagar, KANPUR 208005 4 72 92

Patliputra Industrial Estate, PATNA 800013 6 23 05

Hantex Bldg ( 2nd Floor ), Rly Station Road, 32 27  
TRIVANDRUM 695001

### Inspection Office ( With Sale Point ) :

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\*Sales Office in Bombay is at Novelty Chambers, Grant Road, 89 65 28  
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†Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep 27 68 00  
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